

# Laboratory of Chemical Biology

## Introduction

The Laboratory of Chemical Biology is a laboratory of the department of BioMedical Engineering for research and education in the areas of biochemistry and cell biology. To keep working in this lab a safe and pleasant experience, it is important to obey certain safety measures and general rules. Many of these rules are actually required by law, e.g. for handling genetically modified organisms (GMO's, or (GGO's in Dutch)). Other rules are there to make working in the lab as safe and efficient as possible.

Three different kind of risks can be identified: the use of harmful chemicals, the risks associated with working with biological agents, and risks involving equipment/glassware. The safety measures described in this document are there to minimize these risks, both for the health of the persons working in the lab and for the environment. The laboratory of chemical biology meets the requirements for working at the ML-I (HeO 3.01/3.01a/ 3.17/3.17a) and the ML-II level (cell lab, HeO 3.01b/3.01c). Most work at the ML-I level involves recombinant expression of proteins in *E. coli* or yeast expression systems, and the application of bacteriophages for phage display. Work in the cell lab typically involves the use of immortalized cell lines, but it can also involve tissues or primary cells from animals or humans.

## Working on the lab

Since many people are using this lab, everyone is responsible to keep it a safe and clean environment. So always wear a closed lab coat, disinfect your workspace before and after your activities involving biological material with 70% ethanol and always wash your hands before leaving the lab. When you're finished or at the end of the day always remove the biological agents of your table. Keep not only your workspace clean, but especially also the general workspaces and instruments. Label all material (name, date, what's in it), so possible risks are clear for everybody. (Things that are not labeled well can be thrown away during lab cleaning!). Always ask if you want to use someone's personal buffers, pipets, workspace, etc. Tell Peggy de Graaf when some stock is almost finished, so it can be renewed in time. A list of important do's and don'ts is included at the end of this document.

## Entrance

The Laboratory of Chemical Biology has **restricted** access and only authorized persons can enter the lab using an authorized TU/e pass. The lab manager (Peggy de Graaf) is responsible for authorization. New employees can only be authorized for entry after introduction by their supervisor and/or lab manager and after a guided safety tour of the lab. When working with GMO material or cell work, additional permission has to be granted by the biological safety officer. For visitors who only have to be in the lab for a short time, e.g. for maintenance, a 1-day guest pass can be obtained from Peggy after writing down the name and telephone number.

Always use the main entrance door! The other doors are only in case of emergency.

## Registration

At the entrance of the lab you can find a log book. It is mandatory to report all the activities with GMO's and human material in this log book. This log book is compulsory by law and you can find a lot of things in it like GMO work registration, who's working at the lab, incidents and what to do, storage, lab map, lab cleaning. All (even small) accidents and spills have to be registered as well.

## Personal belongings

To protect contamination of your personal belongings you are not allowed to bring them into the lab. Bags, laptops, etc can be stored outside the lab in lockers. Eating, drinking or smoking is not allowed, and neither is storage of food or drinks. If you want to store your personal stuff in a locker ask Peggy de Graaf for a key.

## Personal protection (lab coats, gloves, safety goggles)

Wearing the lab coat is one of the most important safety measures in the Laboratory of Chemical Biology. Always wear the lab coat in the lab, even when you're only in for a short time. The lab coats are labeled green for the ML-I and blue for the ML-II laboratory. You can change them near the entrance of the cell lab. All the lab coats have to be autoclaved before sending them to the laundry. For temporary visitors of the lab there are special guest lab coats near the entrance of the lab.

Gloves (mostly latex) are used for handling chemicals and for working DNase free. In the cell lab they are also used for working with biological material in the Bio safety cabinets. To avoid contamination of equipment, door handles etc. please wear gloves only when necessary and remove them immediately after the experiment. E.g. don't open doors or work at the computer with gloves on. Nitrile gloves are available for handling chemicals that pass through latex (e.g. acryl amide) or for persons allergic to latex. Cryo-gloves and heat-resistant gloves are present for handling cold and hot materials, respectively.

Wearing safety goggles is compulsory all the time! When handling dangerous chemicals (e.g. strong acids or bases), it is mandatory to work in the fume hood, in addition to wearing personal protective gear.

## Safety measures

Standard safety equipment such as fire extinguishers, eye showers and fire blankets are located at various locations in the lab, please familiarize yourself with their locations. Work with hazardous chemicals has to be done in chemical cabinet/fume hood. Storage of (light) flammable and hazardous agents corresponding to the requirements set by law has to be stored in the yellow fire safety cabinet ("DUPA kast").

The work with animals of human cells is done in the class II Biosafety cabinet in the Cell lab (HeO 3.01b/3.01c). The purpose of this cabinet is not only to create a sterile environment but also to protect you and the environment. The air is filtered through a

HEPA filter before leaving the cabinet. The filtered air will however, recirculate through the laboratory. This cabinet is suited for experiments with class 2 pathogenic material or ML-II GMO material.

Hepatitis B vaccination is required for all those wanting to work in the cell lab to prevent a possible infection. Just ask the lab manager to arrange this for you.

## **Equipment**

When equipment is used, check the proper procedures to work with it beforehand and check whether the apparatus is still functioning properly. For every piece of equipment an experienced person in the lab is responsible, you can ask for an introduction or tell when there's something not working well. If you have any doubts always ask the person responsible or your supervisor (for students). Some instruments have a calendar where you can sign in to make a reservation. Leave the equipment and its surrounding area neat and clean after use.

## **Lab cleaning**

Every 6 weeks 2 members of the lab are responsible for the cleaning of the lab. The necessary cleaning activities you can find in the logbook and the schedule also at the whiteboard at the entrance of the lab.

The cleaning company ISS is only responsible for cleaning the floors and discarding the normal waste.

## **Waste**

All solid biological waste (ML-I and ML-II) is collected in the red biohazard bags and transferred in the leak-free blue "hospital" containers. After closing, labeling and disinfecting the exterior of the container with 70% ethanol it can be disposed of as special waste.

Solid waste contaminated with phages can also be collected in the blue "hospital" containers.

Liquid biological waste has to be autoclaved (20 min. at 121°C) and can be discarded afterwards in the sewer.

Liquid waste contaminated with phages has to be disinfected in a bottle with concentrated chlorine at least overnight.

Glass and instruments which have been in contact with the biological agents must also be autoclaved and can be cleaned in the dishwasher, subsequently.

Glass and instruments which have been in contact with phages must be disinfected overnight with a chlorine solution, then washed with water, cleaned in the dishwasher and autoclaved.

Chemical waste has to be collected in the chemical trashcans in the lab, transferred in the "wisseldrum" near the autoclave and disposed off when it is full.

Only non contaminated waste like tissues and packaging material can be thrown away in the normal trashcans and will be disposed off by the cleaning company ISS. All disposable material like pipettes, eppendorf tubes, etc should not be thrown in the normal waste

trashcans. Even when they are not contaminated biologically or chemically, they should be disposed as 'chemical waste'.

Needles should be collected in the special disposal containers for sharp hazardous waste on the lab. Only use needles when it's really necessary and there's no other (safer) way to do your experiments.

## **Evening control**

Every day one person is responsible for the evening control. The schedule is located at the time registration list in the hall. At 18.00 he/she checks the lab to see whether everything is clean and apparatuses have been shut down. He/she then turns off the lights and closes the lab. If a person is working after 18.00, the responsible person still checks the lab and then transfers the responsibility of the evening control to that person and writes his/her name at the schedule.

If you are unable to perform the evening control (due to holiday, etc), you should make sure that someone else will do it in your place.

## **Working after hours**

In the Laboratory of Chemical Biology, working in solitude is usually not permitted. In special cases it is possible to work after hours until 23.00 hrs and/or in the weekends, but only when a colleague is in and the work is "low risk". So e.g. don't work with the flame for culturing, but use the incubators that can cool to 4°C. Furthermore, a license to work after hours should be obtained from the secretary and your name and working period should be known to the lab manager. When working after hours you should report yourself and the location where your work at the central security office in the main building of the TU/e (Tel 2020). Don't forget to also report when leaving the lab, after finishing your work. Students are not allowed to work after hours or in the weekends.

## Bio safety rules

The list describes the rules that are valid in the Laboratory of Chemical Biology. You are expected to follow these rules, failure to do so can result in a prohibition of access to the lab. Study the rules carefully and try to understand the reasoning behind them. Also build up the habit of following these rules, even when you think no caution is needed.

1. Keep windows and doors shut.
2. Keep everything clean and tidy, make sure enough disinfectant is present.
3. Always wear a marked and closed lab coat, which is not permitted outside the lab.  
The lab coats have to be sterilized by autoclaving before sending it to the laundry.
4. Don't wear any watches or jewelry, or keep them covered by gloves or lab coat.  
Bags, laptops etc. are not allowed and can be stored outside the lab in lockers.
5. Avoid any contact between your hands and your face. Don't eat, drink or smoke inside the laboratory. Storing food or drinks is also not allowed.
6. Avoid formation of aerosols. Mix and centrifuge in closed tubes. The use of a needle is allowed only when no other method is available.
7. Pipetting with the mouth is not allowed; use the available equipment (pipette boy or pipette bulb).
8. Always disinfect your working space before and at the end of your activities.
9. After a contamination of your working space (e.g. when you spill any biological material) disinfect the working space.
10. After working with biological agents and when leaving the laboratory, always wash your hands with water and soap.
11. All re-usable materials that were in contact with biological materials have to be sterilized before being washed or discarded.
12. Solid biological material is gathered in the red biohazard bags, transferred in blue containers and disposed off as special garbage. Liquid biological waste has to be autoclaved before it can be discarded.
13. All accidents and spills, and all activities with GMO's or human material have to be reported in the appropriate logbook.

**Know what you are doing. If you are not certain, ask!**

## Safety measures for specific cases

### FIRE:

**First warn your colleagues** in the lab, and assure your and their safety. **Then call 2222.** If you can control the fire without any danger to yourself, you may try to do so. Fire blankets and extinguishers are present at various places at the lab. Emergency showers are present in the hallway near the two emergency exits.

### ACCIDENTS

**Call First Aid at 3120 or 2222**, then warn the lab manager or your supervisor. Report the accident in the log book.

### SPILL OF CHEMICAL OR BIOLOGICAL AGENTS

Assess the risks of cleaning and only clean up in cases where no danger is imposed on yourself or your colleagues. After cleaning of spilled biological agents, don't forget to disinfect the surface. If you have any doubts ask for help from an experienced researcher, or the lab manager. Report the incident in the logbook.

### GLASS INCIDENTS

Clean up in a safe manner. Collect broken glassware in the blue "hospital" containers. If you have any doubts ask for help from an experienced researcher, or the lab manager. Report the incident in the logbook

### INJURIES:

- Cuts and needle injuries can be cared for by the First Aid post at the reception of Helix (Tel 3120), or by a colleague using the first aid kit next to the registration list.
- When the wound (possibly) has been in contact with harmful chemicals, rinse the wound extensively with water.
- When the wound (possibly) is infected by harmful biological material, first rinse the wound extensively with water, then disinfect the wound with 70% alcohol or iodine-solution and follow the 'cut and/or needle injuries involving human material' (below)
- If necessary further measures can be taken, like a visit to the company physician (only with appointment) or the medical aid of the hospital.
- All cuts and needle injuries have to be reported to the lab manager and in the log book, including name, cause and consequences.
- Incidents or accidents involving biological material and/or injury should always be reported to AMSO, using the 'ongevallen meldingsformulier' which can be found on the TU/e website: [w3.tue.nl/nl/diensten/diz/bedrijfshulpverlening\\_bhv/ongevalmelding/ongevallen\\_meldingsformulier/](http://w3.tue.nl/nl/diensten/diz/bedrijfshulpverlening_bhv/ongevalmelding/ongevallen_meldingsformulier/)

### CUT AND/OR NEEDLE INJURIES INVOLVING HUMAN MATERIAL

- Report at Prikpunt: 0800-774 54 636 (24h/7d)
- Follow advice from Prikpunt
- Report at the (BVC) and/or supervisor

## Important telephone numbers

### EMERGENCY:

Calamities (fire, accidents)	2222
First Aid post (reception Helix)	3120
First Aid Wieb Kingma (STO 3.31)	2650/**65
First Aid Wencke Adriaens (STO 3.28)	5301
Biological Safety Officer (BVF): Moniek de Liefde (GEM-Z 4.106)	2239
(Outside office hours: 040-2982573/06-53650411)	
Substitute Biological Safety Officer: Marloes Janssen (GEM-Z 4.105)	3075
(Outside office hours: 0492-840278/06-53983963)	

### ROOM-/EQUIPMENT MANAGEMENT

Responsible staff member: Maarten Merx (STO 3.22)	4728
Labmanager: Peggy de Graaf (STO 3.27)	5305

### GENERAL

Security (main building)	2020
Reception Helix	3120
Storage Special Chemicals (Berging Bijzondere Chemicaliën (BBC))	4343
Laboratory of Chemical Biology	
* General lab (STO 3.01)	4456
* Kitchen (STO 3.17) & Fermentation lab (STO 3.17a)	5718
* Cell lab (STO 3.01b)	2996
Technical service: Wieb Kingma	2650/**65
Occupational Safety Health and Environment (OSHE): Arjen Ronner	4411/06-10897574
General building-coordinator: Michael Scheepers	5597/06-22903633
Company health service	2440
Orders: Hans Damen (STW 4.29)	2173



## Do's and Don'ts

Many people use the lab, among which also many short term users (e.g. students). This could lead to an environment where not everyone feels committed and responsible for the functioning of the lab. To keep the lab a place where everyone can work safely and pleasantly, we set up this list of frequently returning (small) irritations. If everyone tries to follow these guidelines, the lab should stay the pleasant work environment as it is today.

- 1) Read the bio safety rules, and handle accordingly.
- 2) Always wear a lab coat and close it.
- 3) Always use the main entrance door.
- 4) Keep all emergency doors free.
- 5) Register for equipment at the calendar next to it.
- 6) Put everything back where it belongs after use.
- 7) Clean up after yourself. Cleaning your workspace is also part of your experiments.  
Special attention for:
  - (Micro) balances, clean after **every** use, so that you don't expose your fellow researchers to substances of which they don't know what it is.
  - Erlenmeyer's with medium waste in the safety cabinets in the cell lab, **empty after every use** and put a new sumotox tablet in the flask and return it to its place.
  - Put biological contaminated glassware in the autoclave box and autoclave when the bottom is full.
  - Turn dishwasher on when it's full and empty it when it's finished.
  - Throw away packaging material from arrived chemicals, disposables etc.
- 8) Refill disposables like pipettes, pipette tips, tubes, tissues etc when you (almost) finish them, so that the person after you can start working immediately.
- 9) When the blue "hospital" containers with biologic waste are full, disinfect them and dispose them by bringing it downstairs and fill in the form at website from the BBC for renewing them.
- 10) When chemical trashcans on the lab are full, empty them in the "wisseldrum". When the "wisseldrum" is full, dispose of it by bringing it downstairs and fill in the form at website from the BBC for renewing them.
- 11) Label all material carefully (name, date, what's in it), either in the fume hoods, lab tables, fridges or freezers.
- 12) Tell Peggy when some stock is ALMOST finished, so that it can be renewed in time.
- 13) Send a copy of the order to Peggy, if you order something yourself.
- 14) Contact Peggy de Graaf and inform her about which (new) chemicals arrive in the lab and their whereabouts. This holds also true for all personal chemicals.
- 15) And last but not least: Ask!